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ABSTRACT

The objective of this study was to identify effective instructional strategies for teachers involved in health education workshops on human sexuality and environmental health science. More specifically, the study was designed to evaluate teacher learning outcomes following a workshop design utilizing preinstructional strategies. Hartley and Davies (1976) recently stated that organization is the hallmark of good teaching and that sequencing subject material seems to influence student learning outcomes. This study incorporated preinstructional strategies in teacher inservice health education workshops. Learning outcomes of the 192 participants based on posttest mean scores were significantly enhanced. The investigator suggests that findings in this study lend support to use of preinstructional strategies with adult learners. (Author)

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Preinstructional Strategies and Learning Outcome of Teachers in a Series of Health Education Workshops

by

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Introduction

Need For The Study

Educational researchers have been investigating the effects of various preinstructional strategies on learning as reported by Hartley and Davies (1976) with varying results. Bloom's Taxonomy of Educational Objectives (1956) and Mager's Preparing Instructional Objectives (1961) offered an operational framework for researchers studying the effects of behavioral objectives. Simultaneously Ausubelian scholars have been testing the theory of advance organizers (Toth, 1975; Rhodes, 1975) in the absence of operational definitions. Continuous efforts are made to assess the impact of a pretest on learning outcomes (Hartly and Davies, 1976). Nevertheless, studies have frequently reported conflicting results on the effect of behavioral objectives, advance organizers and pretests on learning outcomes. The investigator suggests that minimal research has been conducted on professional in-service populations to study the effect of preinstructional strategies as a guide to achieving stated outcomes (Rowe and DeTure, 1975). Although studies can be cited that investigated the effects on student learning outcomes of teachers trained to write behavioral objectives (Cardarelli, 1971; Clingman, 1972), few studies are available on the effect of programs using preinstructional strategies (pretest, behavioral objectives) as a guide to achieving stated outcomes with professional in-service educators. This study attempted to examine learning outcomes of teachers who experienced an in-service teacher education model utilizing preinstructional strategies.

Problem Statement

What are the effects on the learning outcomes of professional educators participating in health education workshops utilizing preinstructional strategies? The investigator asked several questions which were tested as null hypotheses. Eight groups experienced the in-service model in health education. A total of one-hundred ninety-two (192) in-service educators participated in the study.

Preinstructional Strategies Defined

Pretest (Criterion-Referenced Test)

This form of student evaluation is designed to determine whether a student, in this case an in-service professional, has achieved mastery of a behavior as specified in an instructional objective(s). This approach to evaluation is ideally used for at least four different types of testing purposes. First, criterion-referenced tests may be used for preassessment purposes as is done in this model. Second, criterion-referenced tests may be used for formative testing (Bloom, Hastings, and Madaus, 1971). Third, criterion-referenced tests may be used to determine whether components of the instructional model need modification. Fourth, criterion-referenced tests may be used at the end of an instructional unit to determine whether students have achieved the criterion levels of the stated objectives (Kibler, Cegala, Barker, and Miles, 1974). In this study, a 30-item criterion-referenced test was

used in the Human Sexuality workshop and a 20-item criterion-referenced test was used in the Evnironmental Health Science workshop.

Behavioral Objectives

Course objectives in this case explicity informed the student of the expected behaviors, competencies or performance to be attained by the termination of the learning experience. In this study the learning experience lasted for two full-day Saturday sessions. The objectives were stated as seen in Tables 1 and 2. The investigator draws attention to Objective #5, Table 1. For the purpose of this study, the criterion-referenced test used was based exclusively on the content of the Human Sexuality workshop. The learning outcomes of the individual students were analyzed for cognitive change in criterion test scores. No attempt was made in this study to analyze other specific variable effects.

The investigator draws attention to Objective #6, Table 2. For the purpose of this study, the criterion-referenced test used was based exclusively on the content in the Environmental Health Science workshop. The learning outcomes of the individual participants were analyzed for cognitive change represented in posttest scores. No attempt was made to analyze other specific variable effects.

Table 1

Course Objectives: Human Sexuality

OBJECTIVES: Participants will be involved in affective and cognitive learning experiences about human sexuality which are necessary for effective classroom teaching. As a result of the workshop, participants will be able to:

(1) express some inner feelings or concerns to another person or group of people about several topics in human sexuality.

(2) describe the difference between value clarification and values sharing.

(3) devise a survey.

(4) compile a vocabulary list basic to concepts in human sexuality studies and utilize the information to write educational goals and a teaching unit outline for the classroom as a result of a team effort.

(5) improve the knowledge base on which the course was entered by doing better on the posttest for cognitive knowledge on the biology of human sexuality.

(6) develop more critical reading and listening skills.

Table 2

Course Objectives: Environmental Health Science

COURSE OBJECTIVES: Participants will identify cognitive and affective areas of basic importance for an environmental health program or unit of study in the schools. As a result of the workshop, participants will be able to:

(1) express some inner feeling to one other person or group of people about the effect of environmental conditions on the quality of life.

(2) identify the difference between words about environmental health behavior and patterns of environmental health behaviors.

(3) devise a class survey.

(4) make a list of major content areas that should be included in a school environmental health program.

(5) write an outline of topics, goals, objectives and resources for an environmental education program or unit.

(6) improve the knowledge base on which the course was entered by doing better on the posttest for cognitive knowledge.

(7) develop more critical reading and listening skills.

The Study

One-hundred and one Ss participated in the workshop on Human Sexuality. A paperback text was selected entitled Human Sexuality, a brief edition by J. L. McCary, 1973. The text provided the basic content of the course. Supplementary to the text the Ss saw two films; The Beginning of Life, 1969 and Methods of Family Planning, 1972. A 30-item test was given in the pretest-posttest design. Figure 1 presents sample test items.

---

1. Women are not often capable of multiple orgasms.
   _____True _____False

2. Alcohol can be a common cause of temporary impotence?
   _____True _____False

3. The sex drives of men and women show a significant decrease at about the age of 35 to 40 years?
   _____True _____False

4. Emission of seminal fluid usually at orgasm is called _____
   a) masturbation c) orgasm
   b) ejaculation d) erection

Figure 1: Sample Test Items.
Human Sexuality Workshop

Ninety-one Ss participated in the workshop on Environmental Health Science.

A paperback text was selected entitled Environmental Health - A Paradox of Progress by John Phillips, Jr., 1971. The book presents basic information on cyclic processes, ecosystems, population theory in perspective and the relationship of air, water, land, noise, radiation and pesticide uses and abuses to the quality of life and the state

of human health. Teachers were shown two films. A NBC White Paper documentary called Pollution: A Matter of Choice reviewed some of the major concerns across the nation in the late 60's (oil ports, jet airports, smog...). A second film addressed the energy issue. A 20-item test was given in the pretest-posttest design. Figure 2 presents sample test items.

---

1. Diseases like hypertensive heart disease, cardiovascular disease, pneumonia, lung cancer, chronic bronchitis and emphysema have been found to be closely linked with:

    a) chemical pollutants in water
    b) increased population numbers
    c) chemical pollutants in the air

2. Some known effects like constriction of blood vessels, tensing muscles, secretion of adrenal hormones and increased blood pressure are caused by:

    a) radiation
    b) loud noises
    c) pesticides
    d) particulate matter

3. Radiation health safety officials are now concerned about the health of _____ in mines, industry and other places of business.

    a) men
    b) women
    c) women and men
    d) children

4. Zero population growth means:

    a) having no children
    b) having one child
    c) having two children
    d) having many children

Figure 2: Sample Test Items-
Environmental Health Science Workshop

Regardless of the workshop topic (Human Sexuality or Environmental Health Science) teachers were asked to role play several issues and to develop creative solutions that the school and community could implement. The teachers were asked to return to their classrooms and to elicit questions, concerns or ideas from their students. The teachers shared their findings with each other at the last class session. Relevant resource information was given to each teacher at the end of the workshop (Masters and Johnson, 1970; Sale and Lee, 1972).

Method

Sample

The investigator designed and taught a series of 1-credit health education workshops for interested in-service professionals in Pennsylvania during 1975-76. The workshops were designed to utilize preinstructional strategies (pretest and behavioral objectives) and a posttest. According to the advocates of preinstructional strategies, the workshop model used in this study would enhance learning outcomes (Bloom, 1956; Campbell and Stanley, 1963; Anderson, 1974). One-hundred ninety-two in-service professionals experienced the workshop model. Table 3 presents relevant information of the sample.

Table 3
Sample Population

Group	1	2	3	4	5	6	7	8
	Human Sexuality				Environmental Health			
Teachers (K-6)	3	6	12	9	5	9	6	5
Teachers (7-12)	6	5	12	5	5	13	5	12
Special Education Teachers	4	0	4	2	0	2	0	0
School Nurses (RN)	0	15	2	4	4	9	3	2
Librarian	1	0	0	1	1	1	0	0
Higher Education Instructors	1	0	0	0	0	0	0	0
Other (Ind. Arts, Home Eco., Music, Art, Preschool, Psychology...)	1	3	1	4	5	1	2	0
Total	16	29	31	25	20	35	16	20

Groups 1-4 experienced the model in a workshop on Human Sexuality. Groups 5-8 experienced the same model in a workshop on Environmental Health Science. The model was replicated eight times using two health education concept areas as stated above.

Design

For the purpose of this study a one-group pretest-posttest design was selected (Campbell and Stanley, 1963). The design was replicated eight times with significant gain scores occurring between pretest and post-test scores within groups and across all groups regardless of health education concept being studied (Human Sexuality or Environmental Health Science). Figure 3 presents the design based on Campbell and Stanley, (1963).

0	x	0
0	x	0
0	x	0
0	x	0
0	x	0
0	x	0
0	x	0
0	x	0

Figure 3: One-Group Pretest-Posttest Design-
Replicated Eight Times

At the beginning of the course each participant was given a handout which clearly stated the course goals, expected behavioral objectives and competencies (work samples) they were to accomplish during the two Saturday workshop experience. A pretest was given to establish each participant's entering level of knowledge in the concept area (Human Sexuality or Enviornmental Health Science). One week later, at the conclusion of the workshop, a posttest was given to establish cognitive learning outcomes.

Analysis

The pre-posttest data collected from the one-hundred ninety-two Ss were analyzed using analysis of variance with repeated measures. Program ANOVR from The Pennsylvania State University Computer Center Library was selected. Table 4 presents the variance estimate, group mean scores and group numbers. A 5% level of significance was used for the analysis of all group comparisons.

Table 4

Test Data

Group	N	Test Items Human Sexuality	Pretest Mean Score/ Variance Estimate	Posttest Mean Score/ Variance Estimate	Gain Score
1	16	30	25.4 9.5	26.0 9.5	.7
2	29	30	24.2 9.5	27.9 9.5	3.7 *
3	31	30	24.2 9.5	28.0 9.5	3.8 *
4	25	30	23.7 9.5	27.3 9.5	3.6 *
		Environmental Health			
5	20	20	12.8 4.3	17.0 4.3	4.2 *
6	35	20	13.7 4.3	18.3 4.3	4.6 *
7	16	20	13.6 4.1	17.4 4.1	3.8 *
8	20	20	13.3 4.2	19.1 4.2	5.8 *

*$p < .05$

Presentation of Findings

Several questions were asked to enable the investigator to evaluate the effect of the in-service model on learning outcomes utilizing preinstructional strategies.

Is there a significant difference between the grand $\bar{X}$ pretest score and the grand $\bar{X}$ posttest score of participants experiencing the in-service workshop model?

Are there significant differences between pretest and posttest $\bar{X}$ scores within each workshop group after experiencing the in-service workshop model?

The study had certain limitations and delimitations.

1. The study was conducted from September 1975 to March 1976 in eight regions of Pennsylvania. Each of the eight groups met for two sequential full day Saturday workshop sessions.
2. All participants voluntarily enrolled in the one-credit course.
3. All Ss' experienced the same in-service model.
4. The sample population was a mixed professional group of school nurses, elementary and secondary school teachers and librarians.
5. Only cognitive learning outcomes were directly analyzed in this study.

Tables 5-7 present relevant data that were collected for this investigation. Table 5 presents a summary of data results from Ss experiencing the workshop model in Human Sexuality (Group 1-4).

H_o1: There is no significant difference between the grand mean pretest score and the grand mean posttest score of participants experiencing the Human Sexuality workshop model.

This hypothesis was rejected at the 5% level of significance. Participant posttest scores were significantly higher than their pretest scores over all groups (N=101) experiencing the in-service model.

Table 5 presents the data that were collected to test null hypothesis #1.

Table 5

ANOVR-Analysis of Variance Summary Table (N=101)

Source	df	ms	F-ratio	P
Grand mean score Comparison Pretest/ Posttest	1	389.23	65.90	0.001**
Group Comparison Pretest/Posttest	3	22.67	3.83	0.012*
Error	97	5.91		

*$p < .05$
**$p < .001$

Tables 6-7 present summary data results from Ss experiencing the workshop model in Environmental Health Science (Groups 5-8).

H_o2: There is no significant difference between the grand mean pretest score and the grand mean posttest score of participants experiencing the environmental health science workshop model.

This hypothesis was rejected at the 5% level of significance. Participant posttest scores were significantly higher than their pretest scores over all groups (N=91) experiencing the in-service model.

Tables 6 and 7 present the data that were collected to test null hypothesis #2.

Table 6

ANOVR - Analysis of Variance Summary Table (N=71)

Source	S	df	MS	F-ratio	P
Between Subjects					
Error	368.30	70	5.26		
Within Subjects	655.11	1	655.11	227.70	*0.001
Error	201.40	70	2.88		

*p < .05
(Note: Data in Summary Table does not include group 4, see Table 7)

Table 7

Group 4: ANOVR Summary Table (N=20)

Source	S	df	MS	F-ratio	P
Between Subjects					
Error	80.01	19	4.22		
Within Subjects	336.40	1	336.40	117.06	*0.001
Error	54.60	19	2.87		

*p < .05

Significant differences occurred between pretest mean scores and posttest mean scores of the Ss in Group 4. Based on analysis of within group pretest-posttest score differences, all groups 1-8 made significant gains in posttest scores after experiencing the workshop model utilizing preinstructional strategies.

Summary and Implications of the Study

Based on the analysis of the data collected in this study, the investigator believes that the in-service model utilizing preinstructional strategies has merit and should continue to be refined. Overall findings of the investigation support the use of preinstructional strategies with in-service professionals based on learning outcomes of the Ss experiencing the health education workshops (Human Sexuality or Environmental Health Science).

It would seem reasonable to say that if an in-service model like the one used in this study were used in pre-service teacher training as well as in-service teacher workshops, educators could begin to carefully monitor individual student progress and mastery of stated goals, competencies and objectives. At the same time, the student could evaluate his/her progress according to the stated objectives and expected outcomes. The in-service model is flexible enough to allow students to set their own objectives within the framework of the goals of the program.

The model has potential to enhance some of the process skills already possessed by in-service teachers in Health Science related areas while giving incentives to refine and develop new approaches to old topics.

References

Anderson, E. J. The Effects of Selected Entering Behaviors and Different Cognitive Levels of Behavioral Objectives on Learning and Retention Performance in a Unit on Population Genetics. Unpublished doctor's thesis, The Pennsylvania State University, 1974.

Ausubel, D. P. The Psychology of Meaningful Verbal Learning. N.Y.: Grune and Stratton, 1963.

Bloom, B. S., Hastings, J. T., and Madaus, G. F. Handbook on Formative and Summative Evaluation of Student Learning. N.Y.: McGraw-Hill, Inc., 1971.

Campbell, D. T. and Stanley, J. C. Experimental and Quasi-Experimental Designs for Research. Chicago: Rand McNally and Co., 1963.

Cardarelli, A. F. An Investigation of the Effect on Pupil Achievement When Teachers are Assigned and Trained in the Use of Behavioral Objectives. Unpublished doctoral thesis, Syracuse University, 1971.

Hartley, J. and Davies, I. K. Preinstructional Strategies: The Role of Pretests, Behavioral Objectives, Overviews and Advance Organizers. Review of Educational Research, Spring 1976, 46 (2), pp 239-266.

Kibler, R. J., Cegala, D. J., Barker, L. L. and Miles, D. T. Objectives for Instruction and Evaluation. Boston: Allyn and Bacon, Inc., 1974.

Mager, R. F. Preparing Instructional Objectives. Calif: Fearson Publishers Inc., 1962.

Masters, W. H. and Johnson, V. E. Human Sexual Response. Boston: Little, Brown Co., 1966.

McCary. Human Sexuality, A Brief Editor. New York: D. Van Nostrand and Co., 1973.

Phillips, J., Jr. Environmental Health - A Paradox of Progress. Iowa: Wm. C. Brown Co., 1971.

Rhodes, F. J. The Effects of Advance Organizers on Selected Cognitive Styles and Different Cognitive Structures in a Programmed Learning Task of Grammatical Usage. Unpublished doctoral thesis, The Pennsylvania State University, 1975.

Rowe, M. B. and DeTure, L. A Summary of Research in Science Education - 1973. Science Education, 1975, pp 14-24.

Sale, L. L. and Lee, E. W. Environmental Education in the Elementary School. N.Y.: Holt, Rinehart and Winston, Inc. 1972.

Toth, G. P. Effects of Prior Knowledge and Critical Thinking on The Interpretation of an Advance Organizer in the Learning of a Biology Unit. Unpublished doctoral thesis. The Pennsylvania State University, 1975.

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